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A YEAR
October 3, 1953
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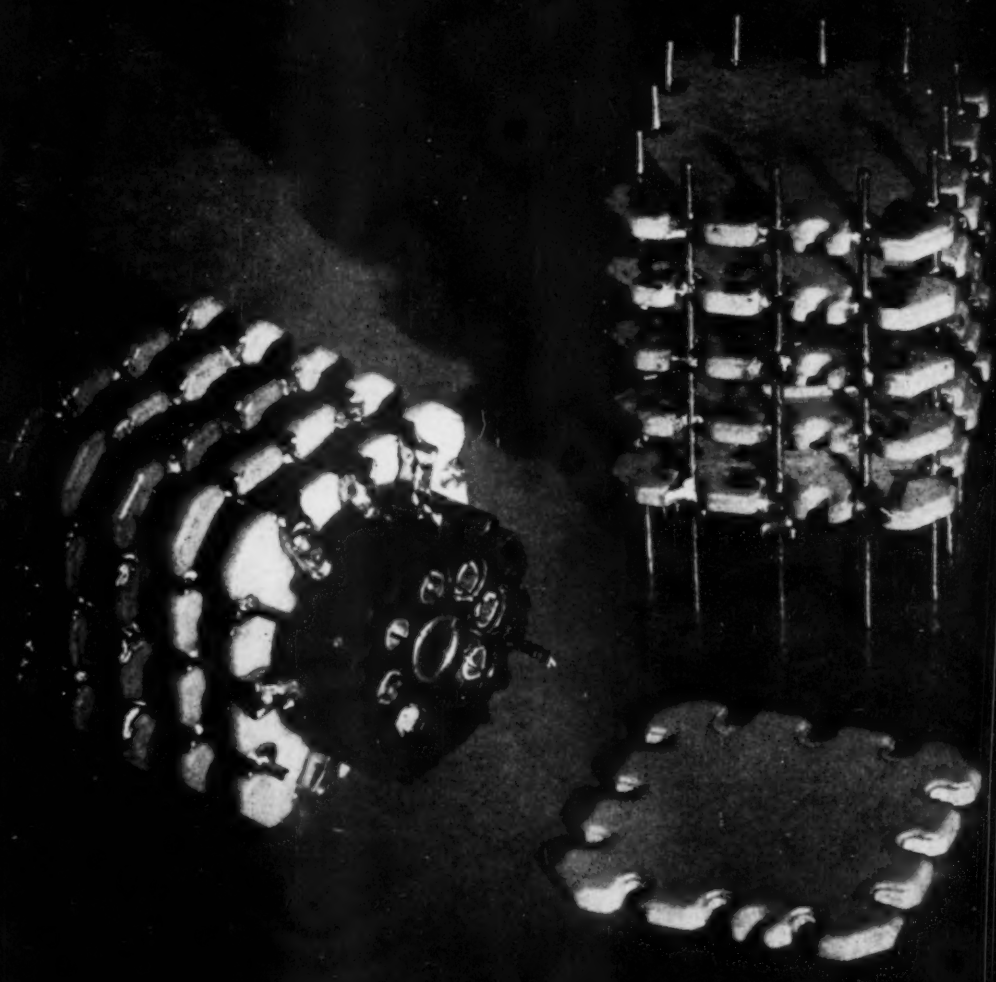
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

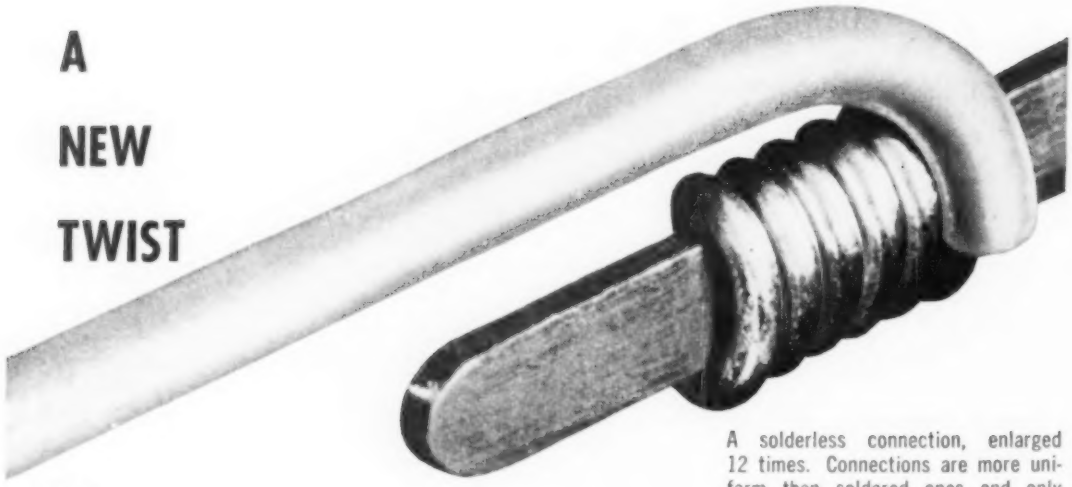


Electronic Tinkertoys

See Page 211

A SCIENCE SERVICE PUBLICATION

A NEW TWIST IN TELEPHONY



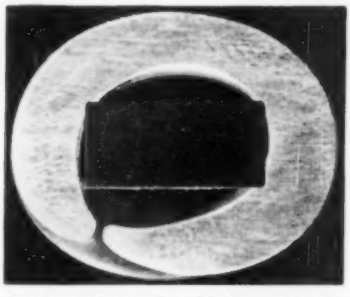
A solderless connection, enlarged 12 times. Connections are more uniform than soldered ones and only half as bulky.

For years the accepted way to connect wires to telephone apparatus was with solder. Now, Bell Laboratories engineers have discovered how to make connections faster and better—without solder.

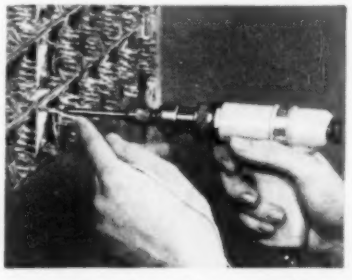
Solder, they reasoned, wouldn't be needed if wire and terminal could be kept tightly pressed together. But, for economy, this had to be done with the wire alone—without complicating screws and springs.

They found the answer in using a properly dimensioned terminal with sharp edges . . . whipping the wire around it under high tension. The terminal bites into the wire, locking it securely into position. Thereafter the squeezed edges maintain a contact pressure of at least 15,000 pounds per square inch—even under vibration that cracks soldered joints.

The new connections can be made in half the time—a big money-saver in the billion connections that Western Electric makes each year for the Bell System. It's another example of the way Bell Telephone Laboratories works continually to keep costs low.



Cross section of solderless connection. Note terminal biting into wire. In a six-turn connection there are at least 20 clean contact areas impervious to moisture and corrosive gases, and offering a low resistance path for current.



Power tool whips wire on terminal in fraction of a second. There is no heat which could damage miniature components . . . no dropped solder or wire clippings to cause trouble later on.

BELL TELEPHONE LABORATORIES

IMPROVING TELEPHONE SERVICE FOR AMERICA PROVIDES CAREERS FOR CREATIVE MEN IN MECHANICAL ENGINEERING

ELECTRONICS

Robot Electronic System

Fully mechanized system for rapid production of electronic equipment revealed. Modules, developed under "Project Tinkertoy," replace conventional parts.

See **Front Cover**

➤ MACHINES INSTEAD of men now can do the biggest part in producing desperately needed electronic equipment for the armed forces during manpower scarcities.

The National Bureau of Standards and the Navy's Bureau of Aeronautics have now revealed "Project Tinkertoy"—a mechanized production system for supplying new-design radar and radio sets in great quantities to the armed services in times of emergency.

Proposed in 1948 by the National Bureau of Standards, the system has now been developed to the point where it is considered an apparent solution to industrial mobilization during periods of national crisis. A working pilot plant in Arlington, Va., has proved the worth of the robot electronic system.

Technically known as Mechanized Production of Electronics, the new system is built around the idea of a basic circuit part called a module. A thousand modules can be produced in an hour. The module is an array of several wafer-like squares of a ceramic material.

Upon each ceramic wafer is printed a section of an electronic circuit. Threads of silver form the wiring and special adhesive tape makes up the resistors. Tiny ceramic condensers and vacuum tube sockets then are added where needed.

Several of these wafers then are machine-assembled to form the module, a major subassembly in the electronic gear being produced. The modules can be put together to form the radar set, radio or electronic bomb sight.

A wafer and two modules are shown on the cover of this week's SCIENCE NEWS LETTER.

The desirability of the new system lies in its flexibility, production speed and minimum manpower requirements. Major improvements can be worked into the equipment on the assembly line within 24 hours. Thus if a device designed for the tropics suddenly must be modified for Arctic warfare, the time lag in its production can be cut 75%.

Few men are required to run the plant. Technical know-how is stored on punched cards that feed metal-fingered robot "hands" with the necessary information.

The system is mechanized even to the point of automatic mechanical and electrical inspection, dictated by the tiny holes in the cards. All this gets around the need for hiring and training large crews of technicians—men whose special skills might be critically needed elsewhere.

During peacetime, the system can be used to produce civilian electronic equipment. It also can be balanced to manufacture both civilian and military equipment at the same time.

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CHEMISTRY

Polyelectrolytes Used As Blood Substitutes

➤ HERE IS a new word for your scientific vocabulary: polyelectrolytes. It is in the news because Yale University has announced a $10,000 grant from the California Research Corporation of San Francisco will be used to support studies in the general field of polyelectrolytes.

Some of these substances are being used instead of blood plasma for transfusions. Others are the basis for soil conditioners that make clay soil tillable and prevent the effects of wind and rain erosion.

Research on these substances originated at Yale, says Prof. Raymond M. Fuoss who will administer the grant. It will be used to finance a year of uninterrupted studies for young men who have shown promise in their research work and who have had from three to five years of teaching experience.

James C. Nichol, associate professor of chemistry at Willamette University in Salem, Ore., has been appointed the first recipient of a fellowship supported by the new grant. He will spend the next year conducting research at Yale under Prof. Fuoss.

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ENGINEERING

Room Inside Room Yields Data on Radiant Heating

➤ ENGINEERS ARE using a room built within a room to check the qualities of a new household radiant heating system that has cooling and heating coils buried in ceilings.

The idea is to find out how much hot or cold water must be pumped through the ceiling pipes, and what its temperature should be, to keep a room comfortable during summer and winter.

The test room at the Armour Research Foundation of the Illinois Institute of Technology in Chicago is surrounded by another room. Heavy insulation between the two rooms keeps outside conditions from affecting the experiments within. About 150 thermocouples constantly measure temperature at different points in the test room. Data gathered by the thermocouples have been recorded in graph form to expedite its interpretation by engineers.

One wall of the test room represents a large window. Its inside surface can be regulated to simulate the scorching heat of a summer day or the frosty temperature of a winter night.

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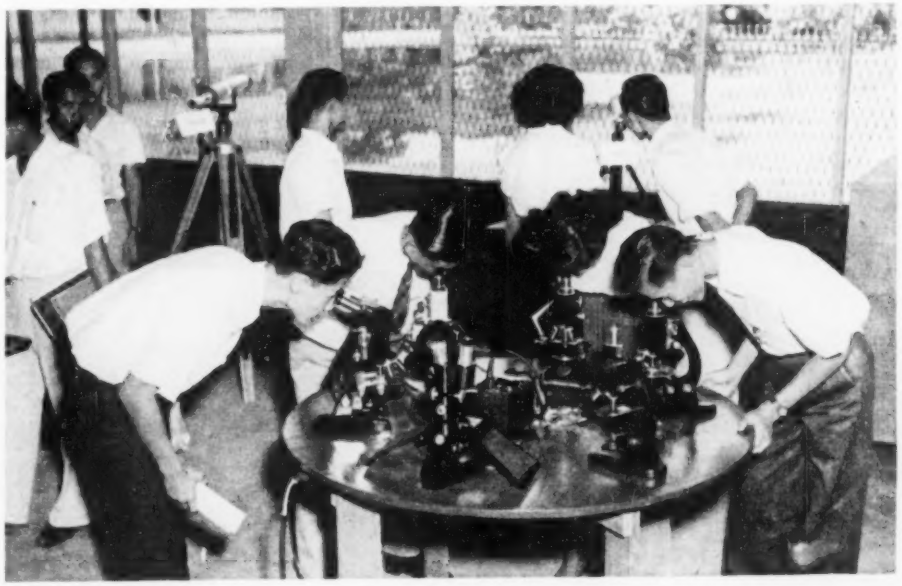

MICROSCOPES ON VIEW—Modern microscopes are demonstrated in Bangkok, Thailand, at the science exhibit of the United Nations Educational, Scientific and Cultural Organization at the Arab Science Congress on human senses.

PHYSIOLOGY

Measure Cell Pick-Up

A method of measuring the action of cells of the reticulo-endothelial system in removing negatively charged colloids may give clue to their basic action.

➤ A WAY to measure the action of certain specific cells occurring in many parts of the body in removing negatively charged colloids may give a clue to the basic action of these cells and their possible part in the response of cancer to radiation treatment.

The special cells are known as the reticulo-endothelial system, RES for short. They have the power to pick up colloidal particles which have a negative electric charge.

Research with a new technique for measuring the rate at which these particles are picked up was reported to the American Chemical Society by Dr. John H. Heller of the Yale University School of Medicine.

Dr. Heller and his co-workers, Drs. Aina Auskaps and Dicran Goulian, inject chromium phosphate in which the phosphorus is radioactive. They are able to measure the rate at which this radioactive phosphorus disappears from the blood stream. They know that it is taken up by the RE system, cells of which are found in particular abundance in the liver and spleen.

By studying the RE system in detail, Dr. E. R. Gabrieli of the section of medical physics at Yale has learned that the structure of its cells is highly sensitive to radiation, and that their function is changed by even a light dose of X-rays or electron beams, in contrast to what was previously thought.

Since the average tumor can be considered 20% more sensitive to radiation than normal cells, Dr. Heller believes that his measurements will show whether there is hope that the relationship in the body between the RE cells and tumor cells might be shifted, by radiation or other means, in favor of normal function and opposed to tumor growth.

By following this research program during the coming year, Dr. Heller and Dr. Gabrieli hope their data will point the way to more exact knowledge of the relation between RE cells and the cells that are abnormal in their functioning, including those of cancer.

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MEDICINE

Cure Warts on Feet

➤ A SIMPLE cure for painful warts on the soles of the feet has been discovered accidentally because a soldier wanted to march in a special parade.

The cure for these warts consists of injecting them with novocaine, the local anesthetic familiar to many as the pain-killer used by dentists. The discovery of this cure is reported by Drs. E. C. Branson and R. L. Rea Jr., from the Surgical Service, Fifth General Hospital, U. S. Army, to the *New England Journal of Medicine* (Apr. 9).

The soldier asked a surgical technician what to do about the wart that might keep him from marching. The technician, thinking to relieve the pain temporarily, injected novocaine. The soldier marched successfully in the parade and in a few days the wart disappeared.

As a result the method was tried and found successful in 48 patients. Of 30 who could be followed for six months, 22 were cured. Seven still had their warts but with no pain. Only one showed no improvement after six months. One had about 30 warts involving the whole sole of his left foot. It would have been very hard to treat these by any of the standard methods.

Patients given the novocaine treatment usually are free of pain or other symptoms within 24 hours. In five to seven days the wart becomes softer and darker. After a week it usually can be lifted out with a thumb forceps.

In the treatment, the doctors point out, it is important to stick the needle through the normal skin at the side of the wart to the stratum germinativum, and to make only one needle puncture so that the novocaine can be injected under pressure.

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PLANT PATHOLOGY

"Flower Clinic" Treats Sick Plants

➤ A UNIQUE "flower clinic" has been established at the University of California at Los Angeles to help protect California's multi-million dollar flower crop.

Here "sick" plants are diagnosed and treated by "plant physicians" in a continuous battle against diseases that cost southern California florists thousands of dollars annually.

Many of the same pathological techniques used in diagnosing human ills are applied to ailing plants. Diseased plant tissue is examined under microscopes to determine the nature of infection. Disease organisms from infected plants are cultured in the laboratory and injected into "guinea pig plants" in the attempt to develop cures or preventive techniques to combat the disease.

Biggest killer of ornamental plants are fungus diseases. Next come virus diseases, followed by those caused by bacteria.

The flower clinic staff consists of Dr. Kenneth F. Baker, chairman of the plant pathology department and specialist on diseases of seed flowers; Dr. J. G. Bald, bulb plant authority; P. A. Miller in charge of trees, shrubs and turf; and Dr. D. E. Munnecke, nursery plant specialist.

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METEOROLOGY

Spot Recurring Weather

Midwest's tornadoes last spring probably resulted from a repeating weather pattern, meteorologists hear. Attempt to capture iceberg described.

► TORNADOES IN the Middle West last spring probably resulted from a weather pattern that repeated every 10 days for over three months, Jerome Namias of the U. S. Weather Bureau in Washington told the international Toronto Meteorological Conference.

For the period from last February to mid-May, he tracked the motions of air masses at 10,000 to 50,000 feet above the earth's surface. From studies of their tracks he found a reason for the often-heard moan that there is "bad weather every weekend."

Ten days, however, was the pattern for the short, repeating change he discovered. These short-term shifts depended on longer, 30-day shifts in a globe encircling air band. The long-period changes "set the stage" for the short-term, stormy ones, Dr. Namias told the joint meeting of the American Meteorological Society and the Royal Meteorological Society.

The world-girdling band of air high in the atmosphere tends to fall into a certain pattern, with a very long, stretched-out wave motion, Dr. Namias said. The form and positions of these waves above the United States caused large masses of warm air from the Gulf of Mexico to clash with cold air from the Arctic over the Great Plains area, causing snow, sleet, high gales, and even tornadoes. This violent action at first strengthened the westerlies, causing a lengthening of the wave motion in the globe-circling air band. However, as the storms died out, the strong westerly winds declined, thus causing the wave motion of the high air band to shorten again. This shortening set the stage for a repetition of the storm-producing clash of cold and warm air masses.

Such a pattern continued, Dr. Namias said, as long as the world-wide, 30-day changes were relatively small. Over the three and one-half month period, however, the high air band's pattern changed slowly, thus finally causing a breakup of the repeating weather.

Jet Flight Forecasts

► FLIGHT FORECASTS at high altitudes for jet airplanes can be made from ground weather observations, Sidney Teweles Jr., of the U. S. Weather Bureau in Washington reported to the Conference. Thus jet pilots flying over areas from which very little weather information is available, such as the Arctic, will have some idea of their safest and fastest routes.

Storm centers stretching from the ground high into the atmosphere, Mr. Teweles has found, give clues to the best flight paths for jets and high flying commercial planes. Such storm centers can also help to pinpoint the highest wind speeds in the jet streams.

Jet streams are narrow, fast-flowing bands of wind rushing at 200 miles or more per hour from west to east at about 30,000 or 40,000 feet. Stormy weather on the ground is connected with the approach of high speed wind centers in these jet streams, Mr. Teweles reported.

To get airplanes to their destination safely and fast, jet pilots need to know the location of jet streams and the strong wind centers found moving with them. Without accurate high level forecasts, these fast-moving winds would make hash of their schedules.

Mr. Teweles revealed results of a three-day, nation-wide study of wind patterns at high altitudes, made last winter as part of the short range forecasting activities of the Weather Bureau. These results gave a three-dimensional picture of the location and movement of the speedy jet streams.

Strong wind centers move along the length of jet streams, Mr. Teweles has found. The conditions that cause these centers, he believes, can be forecast with "some accuracy." Thus jet pilots can be advised as to what flight paths to follow in order to make better time to their destination, as well as to dodge the severe turbulence that is associated with the strong wind centers.

MEASURING LIGHT — John E. Bock, retiring supervisor of the General Electric Illuminating Laboratory, is using this giant white sphere to test a lamp for outdoor lighting.

Iceberg for Drinking Water

► AN ATTEMPT to capture an iceberg in order to get fresh drinking water at a far northern weather station was made in August by the U. S. Coast Guard Cutter Eastwind, Dr. R. W. Rae of the Meteorological Service of Canada revealed at the Toronto Meteorological Conference.

The cutter, after bringing supplies to the weather station at Eureka on Ellesmere Island, tackled moving the iceberg toward shore in order to make sure that the weathermen had fresh water on hand this winter. The Eastwind tried both towing and pushing, but the iceberg refused to budge, Dr. Rae reported to the meeting.

Usually the weather station's water comes from icebergs caught nearby by chance at freezing time. Last year, however, none were caught, thus causing this year's try at capturing an iceberg.

The Eureka weather station is operated jointly by the U. S. and Canadian governments. The mean temperature there during the year is minus 43 degrees Fahrenheit. Ellesmere Island lies off the northern coast of Greenland.

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CHEMISTRY

Chemical Spray Extends Storage Life of Potato

► HOUSEWIVES SOON may be able to keep potatoes and onions in their vegetable bins all through winter and spring, and never find a sprout on them.

A chemical that is sprayed on the vegetables before they are harvested will keep Spanish onions from sprouting as long as eight months, and potatoes as long as 12 months if stored in a cool place. The active ingredient in this new spray is maleic hydrazide, a growth regulator developed by the United States Rubber Company.

Absorbed by the leaves, the chemical works its way down into the bulbs. There it stops any further cell division, thus literally nipping the sprouts in the bud. Actually, this is the same solution some homeowners may have used this summer to retard the growth of grass along lawn edges.

The actual increase in storage life as a result of the spray, however, depends upon the variety of onions and potatoes.

The spray is put to work on onions one to two weeks prior to harvesting when the bulbs are mature and the tops begin to fall. Potatoes get the treatment four to six weeks before harvesting.

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Dead chestnut is still a cash crop in the Appalachian districts as a source of *tannin*.

SURGERY

Talcum for Heart Patients

Heart patients rehabilitated by operation in which talcum is put into sac around heart. Education is road to easy childbirth, surgeons hear.

➤ PATIENTS CRIPPLED by heart disease are being rehabilitated to normal or nearly normal activity by an operation in which talcum is put into the sac around the heart.

Excellent results in 19 patients and good results in another 14 of 47 who had the operation were reported by two New York surgeons, Drs. Aaron N. Gorelik of the Metropolitan Hospital and Dr. Simon Dack of Mount Sinai Hospital, at the meeting in New York of the U.S. and Canadian Chapters of the International College of Surgeons.

The patients reported on had severe disease of the heart's arteries, with severe chest pain, or angina pectoris, and labored breathing.

But the treatment is now being used also on patients with advanced rheumatic heart disease and congestive failure. Early signs are that these patients will be helped but more need to be treated before a conclusion can be reached, the surgeons said.

In the patients with heart artery disease, the body's reaction to the irritation of foreign material, in this case the talcum, stimulates formation of new blood vessels nourishing the heart muscle and promotes the opening of blood vessels in the heart which exist but may not be functioning.

The large size of the particles of talcum, or magnesium silicate, used keeps it from being absorbed by the body. Instead, it remains imbedded in the tissue around the heart for a long time. Some of the patients reported on had been operated on and had talc inserted as long as four years ago.

Successful Blue Babies

➤ A 192-POUND, 19-year-old trainee in the Royal Australian Air Force and a 16-year-old high school student who was a semifinalist in open tennis championship started life as blue babies.

Their cases and other examples of successful operations were cited by Dr. Bruce Shallard of Vancouver, B.C., Canada, at the meeting in New York. Dr. Shallard, reported on a follow-up study of 26 patients who had been operated on at the Royal North Shore Hospital in Sydney between 1942 and 1944.

These once-blue babies suffered from the condition called patent ductus arteriosus. In them, the ductus arteriosus, or channel from the main artery to the artery supplying the lungs, did not close at birth as it normally does.

The result in such cases is a loss of nourishment to the tissues, breathing difficulties, a continuous heart murmur sometimes loud enough to be heard without a stethoscope, and sometimes a blue skin showing the oxygen deficiency. Pain is also frequently a symptom, and the prospects in such cases formerly were for a short life.

The operation that saves these babies and restores them to a healthy life involves cutting the ductus, or channel, and sewing the two ends.

Of the 26 patients Dr. Shallard reported on, 17 were available for re-examination when he made his follow-up study. With two exceptions, they are all "robust, fully developed and leading full lives," he found.

The two exceptions are a child born with multiple deficiencies and an adult with high blood pressure.

"Training" for Childbirth

➤ EDUCATION IS the road to easier childbirth for many women, in the opinion of Dr. Harold B. Davidson, New York obstetrician and gynecologist.

He reported at the meeting that he had delivered babies of about 200 women who had been "trained" for childbirth, and that he "never had a happier group of patients." He emphasized that the idea was not "natural" childbirth.

Dr. Davidson called the technique "planned psychosomatic attention to the psychological needs of the patients, added to standard obstetrical procedure."

"It must be recognized that women vary in the ease with which they have their children," he said. "To some, childbirth comes easily; some find it slow and arduous.

"In the psychosomatic approach it is of the greatest importance to frankly let the patient know that we appreciate that there is real somatic pain during labor; to speak of 'pains' as well as of 'contractions.' We must not try to 'use psychology' on children or to delude.

"We are trying to remove the mystery, to educate the mature woman to face her labor realistically—each to her own needs—and to enable her to master herself so that she can react to her labor with her own best capacity for equanimity.

"She must know that the use of any method of managing her labor is completely optional—the choice is hers. And, each woman must know that her obstetrician will help her; will deny her neither medication nor anesthesia, but that her labor will be conducted according to her own needs and capabilities and her own wishes in respect to this."

Dr. Davidson said that the success of the program depends on the alleviation and prevention of latent anxiety in the patient, adding:

"Any such program appears to operate not only as an active therapy for anxiety already mobilized (though not necessarily conscious), but also in a preventive way against the mobilization of further latent anxiety as pregnancy progresses and delivery time approaches."

Clog Shoes for Bunions

➤ JAPANESE CLOG shoes, with straps between the first and second toes, are good for checking bunions developing in teenagers, Dr. Earl D. McBride of the University of Oklahoma reported to the meeting.

A bunion, or hallux valgus, is a hereditary disease. Many persons have this deformity all their lives without being bothered by it, he said.

A short or pointed shoe will aggravate the condition. Style-conscious teen-agers should be watched, he advised, to see that they do not wear shoes which aggravate the condition. If caught at this age, correct shoe fitting, manipulation and exercises will correct it. At older ages surgery is required for correction.

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METEOROLOGY

Weathermen Forecast Hailstorms Accurately

➤ FORECASTS OF hail, both on the ground and in the air, can be made accurately, two weathermen at Tinker Air Force Base, Okla., have found.

Their method predicts not only the formation but also the size of the hailstones to be expected. The height above the earth's surface to which ground-level air would have to be carried to cause freezing is, they have found, an important indication of hail formation.

To aid other forecasters, Lt. Col. Ernest J. Fawbush and Maj. Robert C. Miller of the U. S. Air Force have drawn a chart of the hail size to be expected based on the height of such freezing levels. "About 8,000 feet above ground" is the best height for fall of hail to the surface. When such a freezing level is higher than 11,000 feet above the ground, large hail may be formed aloft, but only small sizes, about one-fourth of an inch, reach the surface.

Hailstones, they report in the *Bulletin of the American Meteorological Society* (June), "maintain their size for at least 9,000 feet of free fall, after which rapid melting and disintegration take place."

Hail is formed in the strong updrafts that are found as thunderstorms develop. Now that routine operational flights are made during bad weather, hail has become a hazard in flying as well as to crops and property.

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STEEL BRIDGE SPAN—Freedom of form previously available only with concrete has been achieved with steel in the bridge spanning the Rio Blanco River near Vera-Cruz, Mexico, shown here. The structure was designed by Dr. Thomas C. Kavanagh of New York University. Camilo Piccone of Mexico was the engineer of this span, which has slender arch ribs free of cumbersome bracing.

GENERAL SCIENCE

Search Science Talent

➤ A NATIONWIDE search is now under way to find the 40 most promising science-minded high school seniors in the country.

The Thirteenth Annual Science Talent Search was launched with an invitation to seniors in 27,000 public, private and parochial schools throughout the land. They will have the opportunity to compete for $11,000 in Westinghouse Science Scholarships and a five-day visit to Washington. Valuable honorable mention status will go to 260 others. The results of the search will reveal who among this year's seniors will be the nation's leading scientists of the future, and will stimulate others to undertake scientific training.

The Science Talent Search is conducted by SCIENCE SERVICE and supported by the Westinghouse Educational Foundation. Watson Davis, director of SCIENCE SERVICE, in announcing this year's Search, called attention to the growing shortage of scientists and engineers, a shortage which hampers the nation's industrial and defense programs.

"The National Science Talent Search has become the leading method of locating the scientific talent in our secondary schools," Mr. Davis said. "It spots those who deserve special attention by the colleges of the nation. It provides an incentive to youth in high school to study science and undertake their own experiments and projects. It cooperates with teachers of science in inspiring their brightest pupils. Our scientific and technological civilization demands an increasing number of scientists and engineers and the Science Talent Search is a major effort in increasing the quality and quantity of the supply."

Principals and science teachers in secondary schools throughout the country are now receiving instructions on "How You Can Search for Science Talent." They will learn how to recognize science talent among their students and encourage those boys and girls to enter the Thirteenth Annual Science Talent Search.

For complete details of the national and state Science Talent Searches write to Science Clubs of America, 1719 N St., N.W., Washington 6, D. C.

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CHEMISTRY

New Way to Separate Rare Earth Elements

➤ NEW PRACTICAL ways of separating rare earth elements from the minerals in which they occur were reported to the American Institute of Chemical Engineers meeting by Drs. F. H. Spedding and J. E. Powell of Iowa State College, Ames, Iowa.

Rare earths are becoming industrially important, especially in atomic engineering.

The method involves ion exchange or replacing one element with another in order to get the desired element in a more pure or separated form.

A pilot plant showed that out of a crude rare earth concentrate from the mineral gadolinite, the rare earths erbium, ytterbium, dysprosium, yttrium, thulium, and holmium were obtained 99.9% pure. The cost of the chemicals and water used in the process is low despite the large volumes required.

In another process reported by Dr. Spedding with J. Bochinski and M. Smutz, rare earths were separated from each other by extracting solution of their nitrates in water with undiluted tributyl phosphate.

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ANTHROPOLOGY

Fossils Show Indians In Carlsbad Caverns

➤ A FOSSIL record of the Indians, plants and animals that once lived in or near the entrance to Carlsbad Caverns, New Mexico, has lain beneath the feet of the many visitors to this geologic wonder.

Donald M. Black reports in *Science* (Sept. 11) the discovery of a deposit of sediment that is expected to tell what men lived there and when, probably thousands of years ago. Excavations are planned.

From fragments of pottery and sandals, wall paintings, and nearby mescal roasting pits, it has been known that the entrance to the caverns had been long used by the desert Indians as a naturally air-conditioned shelter. Warm air comes out of the cave in winter. Forced evaporation of the moist cavern breezes meeting with the hot, dry desert air makes the cave cool in summer.

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ZOOLOGY

Mirror Image Organs Discovered in a Cat

➤ DISCOVERY OF a cat with mirror image internal organs was announced by Dr. Thomas D. Bair of Utica College of Syracuse University in *Science* (Sept. 18).

Complete reversal of all organs is so rare that Dr. Bair has only seen it this once in about six years' experience in dissecting cats in biology classes, and has seen only one other such case reported.

The kidneys seemed to be the only organs in a normal position in the Utica mirror image cat.

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METALLURGY

Climate, Not Iron, Keeps Pillar Rustless

➤ IT IS the climate and not the kind of iron that has kept the famous iron pillar of Delhi, India, virtually unrusted since it was erected about 1,500 years ago in the fifth century, A.D.

J. C. Hudson of the British Iron and Steel Research Association reports in *Nature* (Sept. 12) that both steel and zinc specimens exposed near the 23-foot, six-ton pillar showed very little corrosion in a year.

The mildness of the climate instead of any intrinsic superiority of the iron itself has protected the pillar against any serious rusting.

Little or no rusting occurs unless the humidity exceeds 70% and this critical value is reached in Delhi only a short time during the whole year. Sulfur pollution that controls corrosion rate when humidity is high is very low near the pillar.

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MEDICINE

Monkeys Help Attack On Artery Disease

➤ THE SCIENTIFIC attack on a serious form of artery disease, called atherosclerosis, may now move ahead faster with the aid of monkeys.

Artery damage like that in humans can be produced in these animals by feeding a special diet, Drs. George V. Mann, Stephen B. Andrus and Frederick J. Stare and Miss Ann McNally of Harvard Medical School and School of Public Health, Boston, announce.

Laboratory studies investigating the possible link between this kind of artery disease and diet have in the past been made with rabbits, chickens, dogs and rats. Rabbits and chickens have been the only laboratory animals so far that developed artery damage from feeding the fatty substance, cholesterol.

The damage in these rabbits, however, is quite distinct from that seen in humans with atherosclerosis. And rabbits and chickens do not eat the same foods man does. The monkey's dietary habits are much like man's, the scientists point out.

Atherosclerosis was produced in new world cebus monkeys by feeding, over a period of 18 to 30 weeks, diets high in cholesterol and low in sulfur-containing amino acids for proteins.

The results, the scientists warn, "cannot justifiably be used for inferences applicable to the human disease.

"To attribute human atherosclerosis to deficency of an amino acid would be both naive and premature at this time. Of more importance is the recognition of a primate species and a dietary procedure for further study of atherosclerosis."

Details of the research are reported in the *Journal of Experimental Medicine* (Sept. 1), published by the Rockefeller Institute for Medical Research.

Science News Letter, October 3, 1953

BIOCHEMISTRY

Clue to Better Drugs From Milk Diet Study

➤ LATEST FINDINGS in research on the milk diet against malaria give hope that scientists will be able to find better drugs against not only malaria but other infectious diseases as well.

The original discovery, by Prof. B. G. Maegraith of the University of Liverpool, England, was that malaria in rats and monkeys could be suppressed by a milk diet.

This probably holds true for man also and may explain why babies in malaria-infested tropical regions do not get malaria, though older children no longer fed exclusively at their mother's breasts do. Human milk, Dr. Maegraith found, proved better than cow's milk for suppressing malaria infection in the rats and monkeys in his laboratory.

Adding para-aminobenzoic acid to the milk, however, causes the disease to reappear. This shows that changing conditions for the host affects the malaria parasite. This latest finding was reported to the British Association for the Advancement of Science meeting in Liverpool.

From knowledge of metabolic activities and requirements it should, Prof. Maegraith says, "become to a limited extent possible to perform our highly unnatural in vitro (test tube) investigations in vivo (in the living animal) in the natural conditions of the host."

His new method of research is expected to lead to study of infective agents in natural environment and to a more logical approach to chemotherapy.

Science News Letter, October 3, 1953

VITAL STATISTICS

Hurricane Death Toll Cut by Weather Warning

➤ A MARKED drop in hurricane deaths in the United States since 1938 is noted by statisticians of the Metropolitan Life Insurance Company.

Of the 3,615 lives taken by these storms in the past 30 years, only 239, or seven percent, were lost since 1938. The number of hurricanes causing loss of life, however, was almost equally divided between the two periods.

The marked reduction in hurricane deaths, the statisticians say, can be credited to successful efforts by the U. S. Weather Bureau and the military services which search out and track these storms while far from our shores and issue early warnings.

Science News Letter, October 3, 1953

NUTRITION

Six Meals Daily for Those in Heavy Industry

➤ NUTRITIONISTS NOW recommend six meals a day for workers in heavy industry and for farmers, the Nutrition Foundation in New York reports. Snacks between meals are especially important when work begins early in the morning, it is found.

A heavy midday meal and a two-meal-a-day-schedule are not good from the standpoint of the workers' production efficiency.

The object of the frequent meals is to give the workers enough food so that his blood sugar does not fall below normal.

Feelings of emptiness and weakness, restlessness, irritability and decreased ability to concentrate go with long intervals between meals. And that drowsy feeling with disinclination to mental or physical effort plus a slowdown in production after a large midday meal comes from a full stomach, but similar effects can be produced when the stomach is distended with air instead of food.

Science News Letter, October 3, 1953

IN SCIEN

BIOCHEMISTRY

Saffron Spice Richest In Riboflavin or B-2

➤ SAFFRON, THE spice so highly prized in the Orient, is "easily the richest known source" of riboflavin or vitamin B-2, researches in Bombay indicate.

Saffron has about three times as much riboflavin as yeast or liver, considered to be rich sources. The vitamin content was assayed both by use of spectrum and by its effect on a test organism.

Part of the flower of the plant, known botanically as *Crocus sativus*, saffron is expensive because it consists of the stigmas, the parts of the pistils of this flower which receive pollen grains and on which they germinate. It is gathered laboriously by hand.

J. V. Bhat and Rajul Broker of the Pathological Laboratories of St. Xavier's College, Bombay, reported their studies in *Nature* (Sept. 19).

Saffron's content of thiamin or B-1 vitamin was found to be insignificant, however.

Science News Letter, October 3, 1953

INVENTION

Polarized Sun Glasses Serve Dual 3-D Purpose

➤ POLARIZED SUN glasses that double as viewers in dark 3-D theaters now are in the process of being patented.

Paul R. Forgrave, a 27-year-old neurophysiologist at the Walter Reed Army Medical Center in Washington, told SCIENCE SERVICE that he has created a pair of glasses with swiveling lenses.

The glasses, he said, should be more comfortable to wear than the awkward cardboard species now distributed at theaters. His glasses somewhat resemble aviation-type sun glasses now available.

To use them in third-dimensional movies, the wearer merely twists the lenses so that the area near the nose moves up toward the forehead. This provides the proper light polarizing angle for viewing Natural Vision 3-D movies. The lenses, however, are worn in the customary position when the glasses are used to shield motorists' eyes from sun-glare.

This is because light forming the glare on roads largely is polarized horizontally. Three-D movie light is polarized at 45-degree angles to this horizontal. The swiveling lenses compensate for the different angles of polarization.

Mr. Forgrave now is pushing a patent application through official channels to obtain legal protection for his invention.

Science News Letter, October 3, 1953

NE FIELDS

HERPETOLOGY

Snake-Scented Food Pleases King Cobra

➤ THE KING cobra has a regal appetite, for a snake. However, zoologists at the Staten Island Zoological Society have devised a method of tricking the cobra into eating such ordinary fare as horsemeat and rats, Carl F. Kauffeld of the zoo staff will report in *Herpetologica*.

Under normal circumstances the king cobra eats only snakes, or snakes stuffed with dead mice and horsemeat, a diet which can use up a lot of snakes. After the Staten Island Zoo king cobra arrived from Thailand in July, it was discovered at one feeding that it would eat a white rat if the rat had been rubbed against a water snake.

A series of scientific tests established the importance of scent in the cobra's feeding, and the scientists have now decreed a diet of horsemeat and rats flavored with water snake and supplemented with vitamin pills for the cobra. The meat is stored for a few hours prior to the feeding period in a jar with water snakes. After this scent-impregnation, the cobra takes his horsemeat like a gourmet consuming caviar.

The 14-foot snake also has a pretty healthy appetite for a snake and will take up to three pounds of meat at a feeding.

Science News Letter, October 3, 1953

BIOCHEMISTRY

Chemical in Body Sets Resistance to Tuberculosis

➤ A CHEMICAL factor in the body seems to be important in resistance to tuberculosis, Dr. Quentin Myrvik of the department of microbiology and the University of Virginia Medical School has stated.

Speaking as guest of Watson Davis, director of SCIENCE SERVICE, on the Columbia Radio Network Adventures in Science program, Dr. Myrvik explained that research upon the enzyme, lysozyme, is expected to provide a means of measuring man's resistance and perhaps increase it when necessary to combat infection.

"In the animal kingdom it is quite common to observe that one specie of animal, such as the guinea pig, is susceptible to tuberculosis, whereas another specie, such as the rat, is notoriously resistant," Dr. Myrvik said. "A similar situation occurs in humans. A small percentage of humans appear to be extremely resistant to tuberculosis, whereas a corresponding groups appears to be susceptible."

The studies in Dr. Myrvik's laboratory indicate that an enzyme called lysozyme may be important in these different states of resistance to tuberculosis. For example, the level of lysozyme in rat serum approaches the inhibitory level for tubercle bacilli. In contrast, the lysozyme content of the susceptible guinea pig is approximately one-fiftieth that of the rat.

"The basic principle of the research program is to catalog, identify, and quantitate anti-bacterial substances which play a role in man's natural and acquired resistance to infectious diseases," Dr. Myrvik declared. "Once this is established for diseases like tuberculosis, it will provide a means of measuring man's resistance, and perhaps altering it and raising it to its optimum, when infections ensue. Conventional bed rest therapy in the case of tuberculosis is an empirical method to accomplish maximum natural resistance of the individual."

Science News Letter, October 3, 1953

METEOROLOGY

Turbulence in Clear Air Jolts High Flying Planes

➤ CLEAR AIR turbulence, which can cause jolting of passengers in both high flying jets and commercial planes without visual warning, can be spotted on weather maps.

This intense bumpiness is not a "ghost-like" occurrence, but has a definite association with the jet stream, LeRoy H. Clem of U. S. Weather Bureau in Washington, told the international Toronto Meterological Conference recently.

Jet streams are narrow bands of high-speed winds found around 35,000 feet above the earth's surface. The jolting and jarring caused by clear air turbulence above 25,000 feet occurs near the maximum wind speed centers that travel along the jet stream, and not just with the jet stream in general, Mr. Clem pointed out to weathermen attending the joint meeting of the American Meteorological Society and the Royal Meteorological Society in Toronto.

These maximum wind centers can be spotted and tracked on upper-level weather charts through the use of new wind detection equipment. This electronic equipment traces wind speeds from the earth's surface well into the stratosphere, which starts at about 40,000 feet, much higher than previously possible. Weathermen therefore can get a much clearer picture of the variations in the winds, particularly at higher levels.

There are radical, vertical changes in the wind's speed near the jet maximums, Mr. Clem has discovered, and clear air turbulence is found where these sharp changes occur. He has found cases where the wind varied more than 50 miles per hour in 1,000 feet, and believes greater changes could be expected.

It now appears possible, Mr. Clem said, that plane-shaking turbulence at high levels can be forecast and thus dodged by high-flying planes in the near future.

Science News Letter, October 3, 1953

MEDICINE

Stopping Antibiotics Can Save Patients

➤ IN SOME cases life may be saved if the doctor stops giving penicillin or streptomycin, antibiotic drugs famous for the many lives they have saved.

Five cases in which these famous medicines reversed their usual life-saving roles, with three of the patients dying, are reported by Drs. Chester W. Fairlie and Ralph E. Kendall of Hartford, Conn., in the *Journal of the American Medical Association* (Sept. 12). In two of the five, the patients were saved when the doctors recognized the trouble and stopped the drugs.

All five patients got the two medicines by injection into the muscles. The antibiotics were given as prophylaxis against possible infection after operations.

Fever and diarrhea were the "cardinal" symptoms at the beginning of the condition which killed three of the five. The doctors call the condition *Staphylococcus enteritis*, meaning inflammation of the intestines due to staphylococcus infection. But, they say, the condition should really be considered as toxicity, or poisoning, from disturbed environment in the intestines. It is not, they think, just a matter of the antibiotic suppressing organisms normally present in the intestines and thus letting staphylococci grow to disease-causing numbers. More likely the antibiotic actually stimulates the staphylococci to grow.

"A direct stimulation of the Staphylococcus by antibiotics must be considered," they declare.

Fever and diarrhea appearing in a patient getting antibiotics should immediately suggest this complication. The antibiotics should be stopped at once, they advise, and attention given to fluid and salt balance in the body.

Science News Letter, October 3, 1953

CHEMISTRY

Year's Nitrogen Supply With One Resin Shot

➤ A FULL year's supply of nitrogen can be applied safely to a garden in one application of a new fertilizer material.

The same products that make Bakelite, the stable plastic widely used for telephone instruments, electrical insulation, and similar uses, can be put together in a slightly different way to make fertilizer to promote plant growth. Urea and formaldehyde, by a new formulation reported to the American Chemical Society meeting in Chicago combine to give a granular material that, in moist garden soil, slowly makes nitrogenous food available to plants.

The new material has been named uramite by its developers, Drs. R. D. Kralovec and W. A. Morgan of the polychemicals department of E. I. du Pont de Nemours & Co.

Science News Letter, October 3, 1953

ASTRONOMY

Jupiter Seen Again

The giant planet is visible in the eastern sky late on October evenings. Two actors in the recent doubling of distances to other galaxies can also be seen.

By JAMES STOKLEY

➤ AFTER HAVING been gone from the evening sky since late last spring, the giant planet Jupiter is now with us again. At the beginning of October it will be visible late in the evening, and by the end of the month it will be seen at a somewhat more reasonable hour.

Its position, in the constellation of Taurus, the bull, is indicated on the accompanying sky-maps. These show the appearance of the heavens at about 10:00 p.m., your own kind of standard time, Oct. 1; 9:00 p.m., Oct. 15, and 8:00 p.m., Oct. 31.

Jupiter, when seen, will be low in the northeast and east, but it will be so bright that it should not be hard to identify.

Jupiter, a planet, shines by reflected sunlight, in contrast to the stars, which emit light themselves, like the sun. The brightest star visible these evenings is Vega, in Lyra, the lyre, high in the western sky.

Directly above it is Cygnus, the swan, with first-magnitude Deneb; while a little to the left we find Altair, in Aquila, the eagle. Still farther left and lower, not far, in fact, above the southern horizon, is Fomalhaut, in Piscis Austrinus, the southern fish.

Another star of the first magnitude is seen in the northeast. This is Capella in the constellation of Auriga, the charioteer, which is just to the left of Taurus, where Jupiter shines. In Taurus itself is first-magnitude Aldebaran, but in the low position at which it is shown, it is somewhat dimmed by atmospheric absorption.

First Magnitude Stars

Although it contains no stars as bright as these, another characteristic group of the autumn evenings is seen high in the south: Pegasus, the winged horse. Three of the stars in this group, plus one in next-door Andromeda, the chained princess, form the familiar "great square of Pegasus."

Going from Andromeda, which is high in the east, down toward the northern horizon, we come next to the W-shaped group of Cassiopeia, which represents the queen, Andromeda's mother. The king, Cepheus, is seen to Cassiopeia's left.

Just below him is Ursa Minor, the lesser bear, in which the pole star, Polaris, shines at the end of the handle of the little dipper. Still farther down, near the northern horizon, is Ursa Major, the great bear, of which the great dipper is part.

Although Jupiter is the only planet now easily seen in the evening, another is there earlier. This is Mercury, which is farthest east of the sun on Oct. 23, but it sets so soon after sunset that it will be very difficult to find. Mars and Venus both are morning stars, rising about two and a half hours ahead of the sun, so that they can be seen low in the northeast as dawn approaches.

Venus is much the brighter, even more brilliant than Jupiter, and is in Virgo, the virgin. Mars, of the brilliance of a second-magnitude star, is nearby. In the first few days of October Venus rises first, but she passes Mars early in the morning of Oct. 4, drawing closer to the sun and rising later.

Mars, on the other hand, is drawing away from the sun, and appears earlier each night. By next spring it will shine brilliantly in the evening sky.

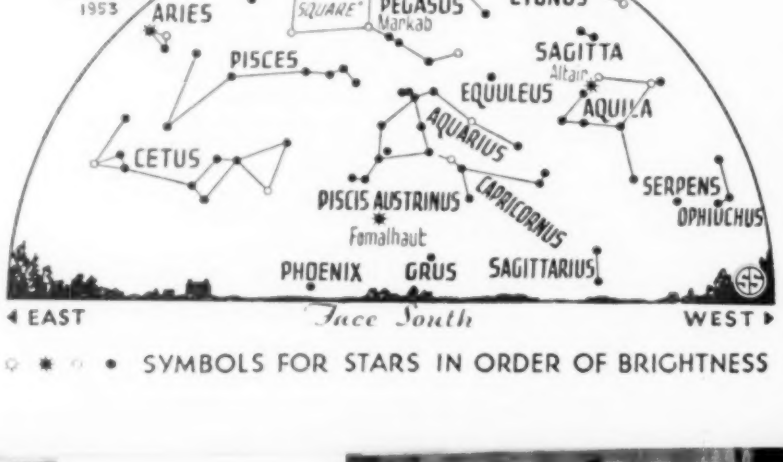
High in the northern sky in October appear two of the chief actors in one of the most important and dramatic episodes in the recent history of astronomy. One of these is in the position indicated by the small cross just above the letter M in the name Andromeda. Looking there, on a dark clear night, one may see a rather faint spot of hazy light, the "galaxy in Andromeda."

All the stars that we ordinarily see in the sky make up a system shaped something like a grindstone. When we look toward the edge of the grindstone, we see the stars much more thickly clustered than toward the side, and this concentration is what we call the Milky Way.

This whole system, our galaxy, contains about a hundred thousand million stars. It is so huge that light, traveling 186,000 miles a second, takes about a hundred thousand years to go across it.

Scattered around the universe, outside our galaxy, are millions of other such systems, and the one in Andromeda is among the closest. Its distance is about 1,600,000 light years, i.e., its light takes that many years to reach us.

Possibly some keen-eyed reader of these articles will recall that on past occasions when we have referred to this object, a



○ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

gure about half as large has been given for its distance. Therein lies the story, for for about a year ago astronomers first heard about some new researches which show that the distances of these outer galaxies are about twice what they were formerly thought to be.

This important conclusion was based on the work of many astronomers at observatories throughout the world, particularly studies of the Magellanic Clouds by Harvard College Observatory astronomers and photographs of the heavens made with the new 200-inch Hale telescope at Mt. Palomar, the largest in the world.

When that instrument went into operation a few years ago, it was thought that it could reach out into space a maximum of a billion light years. Now we know that it can observe out to two billion light years, and smaller telescopes, down the line, can also see twice as far.

Cepheid Variable Stars

Another actor in the story is a star in the constellation of Cepheus, known as delta Cephei. It is indicated on the map by a small arrow. Like many other stars it is a variable; its light changes over a regular cycle, taking about five days to go from one maximum to the next. This is the prototype of the class of "Cepheid variable stars," which are believed to pulsate, shining most brightly as they expand and most dimly as they contract.

Some forty years ago it was found that the longer a Cepheid takes to vary, the greater is its average luminosity, or candlepower. This enabled the stars' relative distances to be found. Then the actual distances of a few were obtained by other means. Since their relative distances were known, the distance of any could be found in light years.

This afforded astronomers a powerful tool. When photographs made at the Mt. Wilson Observatory in the early twenties with the 100-inch telescope, then the world's largest, showed individual stars in the Andromeda galaxy, some of them Cepheids, its distance was determined as about 800,000 light years.

Two Cepheid Groups

With the 200-inch telescope, astronomers looked for some of the fainter, short-period, Cepheids that should be in the stars clusters around the Andromeda galaxy, as they are in similar clusters around our galaxy. These stars were too faint to be detected with the 100-inch, but the new instrument should have revealed them.

When the telescope failed to show them, it was apparent that something was wrong. It looked as if the Andromeda galaxy was twice as far as formerly thought, and that these cluster-type Cepheids were too far away to be seen, even with that powerful instrument.

In several ways astronomers have now confirmed that this is indeed the case. It

turns out that there are two groups of Cepheids, corresponding to the two great classes, or "populations," of stars in general. The cluster stars, and some of the others, fit in with the old figures, but the rest, including those in the Andromeda galaxy used for determination of distance, are four times as bright for the same period of variation.

This means that they are twice as far away as we used to think, for if you move a light to double the distance, it looks a quarter as bright as it did before.

Many other findings also fit in better with the revised distances. For instance, in order to cover the angle in the sky which it is observed to cover, the Andromeda galaxy must be twice as big as formerly supposed, if it is twice as far away. This makes it about the same size as our galaxy. Previously it seemed much smaller, and this bothered astronomers who did not like to think that ours was in any way exceptional.

So, although they have had to alter some of their accepted theories, astronomers welcome the new data. This is the way science advances; step by step, as we acquire new knowledge, we approach closer and closer to the truth.

Celestial Time Table for October

Oct.	EST	
4	1:00 a.m.	Venus passes Mars.
5	8:13 a.m.	Moon passes Mars.
	10:04 a.m.	Moon passes Venus.
6	1:38 a.m.	Algol (variable star in Perseus) at minimum.
	1:00 p.m.	Moon farthest distance 252,600 miles.
7	7:40 p.m.	New moon.
8	10:26 p.m.	Algol at minimum.
11	7:15 p.m.	Algol at minimum.
15	4:44 p.m.	Moon in first quarter.
21	11:00 a.m.	Moon nearest, distance 222,600 miles.
22	early a.m.	Meteors visible radiating from constellation of Orion.
	7:56 a.m.	Full moon (Hunter's moon).
25	11:00 a.m.	Mercury farthest east of sun.
	4:00 p.m.	Saturn in line with sun.
26	6:56 a.m.	Moon passes Jupiter.
29	12:08 a.m.	Algol at minimum.
	8:09 a.m.	Moon in last quarter.
31	8:57 p.m.	Algol at minimum.

Subtract one hour for CST, two hours for MST, and three for PST.

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• Books of the Week •

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AFRICAN LANGUAGES AND ENGLISH IN EDUCATION: A Report of a Meeting of Experts on the Use in Education of African Languages in Relation to English, Where English is the Accepted Second Language, Held at Jos, Nigeria, November 1952—*UNESCO's Education Clearing House*, 91 p., paper, limited number of copies free upon request to publisher, 19, Avenue Kleber, Paris 16e, France.

AMAZON TOWN: A Study of Man in the Tropics—Charles Wagley—*Macmillan*, 305 p., illus., $5.00. The readable story of small town life along the colorful Amazon River, based on data collected while the author made a survey for UNESCO's International Hylean Amazon Institute.

BAILEY'S TEXTBOOK OF HISTOLOGY — Revised by Philip E. Smith, Wilfred M. Copenhaver, and Dorothy D. Johnson—*Williams and Wilkins*, 13th ed., 775 p., illus., $9.00. A text primarily for first year students in medicine and dentistry.

A BRIEF COURSE IN SEMIMICRO QUALITATIVE ANALYSIS—William E. Caldwell and G. Brooks King—*American Book*, 163 p., paper, $2.10. An introductory course; only the more common cations and acid radicals are included.

CALIFORNIA JOURNAL OF MINES AND GEOLOGY, Vol. 49, No. 3—*California Division of Mines*, 74 p., illus., paper, $1.00. This issue includes an article on the flotative properties of titanium minerals in oleate solutions.

CHROMITE DEPOSITS IN THE NORTHERN SIERRA NEVADA, CALIFORNIA — Garn A. Rynearson — *California Division of Mines*, 150 p., illus., paper, $2.00.

THE COMPLETE BOOK OF BULBS—F. F. Rockwell and Esther C. Grayson—*American Garden Guild and Doubleday*, 352 p., illus., $5.95. Whether or not you are a bulb enthusiast, you will enjoy looking at this beautifully illustrated garden book.

THE CONSUMER'S GUIDE TO BETTER BUYING —Sidney Margolius—*New American Library*, 224 p., paper, 35 cents. A new and revised edition of the author's "How to Buy More for Your Money." Advice on purchasing commonly used articles.

EARTH SCIENCE: The World We Live In — Samuel N. Namowitz and Donald B. Stone—*Van Nostrand*, 438 p., illus., $3.96. A generously illustrated high school text on man's physical environment.

EVERGLADES NATURAL HISTORY: Volume 1, Number 1—Joseph C. Moore, Ed.—*Everglades Natural History Association*, 38 p., illus., paper, $2.00 per year. Interesting articles about the animals and plants of our youngest national park, where tropical plants meet their temperate neighbors. The editor is park biologist.

THE EXTERNAL MORPHOLOGY OF THE DRAGONFLY ONYCHOGOMPHUS ARDENS NEEDHAM — Hsiu-Fu Chao — *Smithsonian*, Miscellaneous Collections, Vol. 122, No. 6, 56 p., illus., paper, 60 cents. Intended to apply the knowledge of the most recent morphological interpretations and to serve as a foundation for future taxonomic studies.

FARWELLIANA: An Account of the Life and Botanical Work of Oliver Atkins Farwell, 1865-1944—Rogers McVaugh, Stanley A. Cain and Dale J. Hagenah—*Cranbrook Institute of Science* Bulletin No. 34, 101 p., illus., paper, 75 cents. The contributions of a scientist who was botanist for a Detroit pharmaceutical house for 11 years.

INSECTS CLOSE UP: A Pictorial Guide for the Photographer and Collector Featuring 125 Photographs and Drawings — Edward S. Ross — *University of California Press*, 80 p., illus., paper, $1.50. The photographer will get ideas for nature photography from the remarkable pictures in this small book; the student of nature will delight in their portrayal of insect life.

Science News Letter, October 3, 1953

(Advertisement)

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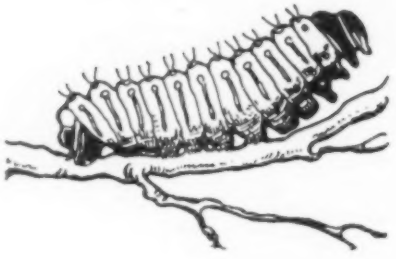
BIOLOGY

NATURE RAMBLINGS



Caterpillars

➤ IF HUMANS could put caterpillars to work for them by some sort of radio device, the drudgery of clipping hedges, mowing lawns, pruning trees and weeding the garden would be over for all time.

Lucullus was a dainty eater compared to the caterpillar. With shearing jaw-action spurred on by prodigious appetite, this fuzzy little monster spends most of its young life chomping away at flowers, foliage, or food in the garden. He chews and chews and chews and chews. The more he eats, the bigger he grows, and the bigger he grows, the more he eats.

The coming of fall sends most caterpillars off to hibernation, spun in rough silky cocoons. But there are some which seem to care nothing for first hints of frost. Bristling little orange-and-black fellows, commonly called woolly bears, nonchalantly hump themselves across the sidewalk on warm October days.

When winter does come, the woolly bear merely hunts himself a well-sheltered corner, curls up and goes to sleep without the formality of a silken sleeping bag. He dreams of early spring, when he will begin eating again, fattening up for the mysterious transformation into a butterfly or gauze-winged moth.

Caterpillars are unpleasant-looking creatures, except perhaps to other caterpillars. Some have gaily-colored coats, but many more are naked, squidgy things, like the cabbage worm or green maple worm. The bigger they are, the more repulsive they are to the queamish—the cecropia, with its rows of stiff, short bristles; the tobacco caterpillar, with its long horn to whack you if you meddle too persistently; the puss and the sphinx which rear up and try to stare you out of countenance.

The caterpillar's life is a hazardous one. His soft, helpless, juicy body is a choice morsel for birds, wasps, ants and other insects. Fungi prey upon him, and man attacks him with poisonous chemicals. But his most terrifying enemy is the family of parasites which like nothing better than to eat him alive from the inside out.

Science News Letter, October 3, 1953

Questions

ASTRONOMY—What are Cepheid variable stars? p. 218.

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BIOCHEMISTRY—What is the richest source of vitamin B-2? p. 216.

• • •

METALLURGY—Why is the iron pillar at Delhi, India, believed to remain unrusted over hundreds of years? p. 215.

• • •

MEDICINE—How can warts on feet be cured? p. 212.

• • •

METEOROLOGY—Why was an attempt made this year to capture an iceberg? p. 213.

• • •

Photographs: Cover, National Bureau of Standards; p. 211, UNESCO; p. 213, General Electric Company; p. 215, The James F. Lincoln Arc Welding Foundation; p. 224, Semco Research, Inc.

A Shopping Tour Around the World For Only $2.00 a Month!

Armchair adventurers take magic carpet trips to the four corners of the earth on exciting shopping sprees for only $2.00 a month!

By Norma Bruce

EVERY month, thousands of adventure-loving Americans receive mysterious looking parcels, enclosed in exotic wrappings and plastered with foreign stamps. These packages come all the way from India, Africa, France, Egypt, Japan, England, Norway . . . or some out-of-the-way place you've never dreamed of!

The contents are always a complete surprise. One month, the postman may deliver a curious looking package containing an exquisite example of handwrought silver from the Far East . . . at another time, a woodcarving from sunny San Marino . . . or, a piece of Florentine sculpture from the birthplace of the Italian Renaissance . . . or again, a shimmering, pure silk *sari* from India, traditional article of clothing for the Hindu *Maharanees*. Each new gift brings these "armchair travelers"—members of the unique *Around-the-World Shoppers Club*—a greater thrill than the last. For whatever the surprise package may be . . . no matter from what far corner of the earth it comes . . . the gift is invariably beautiful . . . chosen with taste . . . a superb example of traditional craftsmanship!

Membership Costs Just $2.00 Per Month

Members of the Around-the-World Shoppers Club receive these gifts for only $2.00 (and even less) per month. There are good reasons for this: the magic of the American dollar (foreign countries are eager for dollar credits) enables the Club to purchase fine foreign products at a fraction of their cost in this country. But that's not all. Even if an American tourist with his pockets stuffed with dollars were to tour the foreign countries in person, he still couldn't match the low Club prices. Huge membership means huge buying power. In many instances, the Club absorbs the *entire output* of a foreign artisan's studio over a long period of time. Tremendous savings are made by such large-scale buying. These savings are passed on to Club members.

Club Representatives Know "All the Angles"

In addition, the men who represent the Club abroad are trained, professional buyers. They are familiar with the market places of the world! They visit the great international fairs. They are acquainted with out-of-the-way places the average traveler never heard of. In short, they know where to discover the hard-to-find, the unique, the outstanding buys.

These experts—to the further advantage of Club members—study the ups and downs of foreign markets. Recently, for example, the Greek drachma fell 50% in value. Immediately, a Club representative flew to Athens. He visited the leading artisans of the country . . . finally uncovered a gift of rare beauty that could be sent to members for $2.00. If purchased a month earlier, this same article would have cost $4.00. If imported for sale in American shops, its price might have ranged from $5 to $10!

Gifts Are Intriguingly Different and Useful

Many American travelers return home from abroad with trunkloads of useless, high-priced "tourist trinkets." Not so these arm-chair travelers who belong to the Around-the-World Shoppers Club! They are receiving beautiful articles for the home, valuable decorative pieces, personal items they can use every day of their lives. And there is something for every member of the family—young and old. The Club is careful to select gifts that are *unusual and practical*—items that are seldom seen in American shops—articles that will give a lifetime of service and pleasure. Every gift represents the best of native art and craftsmanship. Many are made entirely by hand. Fine glassware, metalware, costume accessories, sculptured alabaster, laces, ceramics . . . these are but a few of the typical Club selections. Hundreds of unsolicited letters—on file in the American offices of the Club—attest to the extraordinary enthusiasm with which members receive their gifts.

The Case of the Famous Perfume Flacon

The petit Parisian perfume flacon is a good example of how club purchases are made. The Club's buyer in France discovered it in a small Paris studio. When he first saw this little gem of etched metal and glass, he instinctively knew it was "right" for discriminating American women.

So in due time, these hand-made flacons were purchased, packed *á la francais*, and mailed direct from Paris. Almost overnight, it became one of the most talked-about items the Club had ever distributed. The mail was tremendous. Thousands of smart American women wrote to congratulate the Club for selecting this delightful *frivolité de Paris*. Incidentally, the same item was later sold in one of New York's exclusive shops for twice the price paid by Club members. This story is typical of dozens of such Club purchases.

How to Join the Around-the-World Shoppers Club

A prospective member may join simply by sending his name and address to the American office of the Club, given below. Membership is free, and there are no charges other than for each monthly gift. All duty and postal charges are prepaid by the Club. (The United States Post Office Department charges 15¢ each for the delivery of small packages from foreign lands which cannot be prepaid.)

The Club may be joined on any of the following plans: 3 MONTHS MEMBERSHIP for $6.00, 6 MONTHS MEMBERSHIP FOR $11.50, 12 MONTHS MEMBERSHIP for $22.00.

Bonus Gift to New Members

The Club also offers each new member a special Around-the-World Shoppers Club Bonus Gift *without charge* when he joins. This gift will be sent from a foreign country as soon as the new member's name is received overseas. The Club asks you to examine the gift carefully. If you decide not to join the Club after all, keep the Bonus Gift anyway. Notify the Club and you will receive a prompt refund of your payment!

You May Cancel Membership at Any Time

The tremendous growth of the Around-the-World Shoppers Club in recent months . . . the hundreds of letters from delighted members all over the nation—prove beyond doubt that the "armchair travelers" who belong to the Club know a wonderful bargain when they see one! The minute you unwrap your Bonus Gift from abroad, you will understand why the Club is so popular. You'll be amazed that such gifts can be sold for only $2.00 each! However, you are free to cancel your membership at any time. (Please give 30 days' notice to allow for transmittal to the Club's offices abroad.) The unused portion of your payment will be refunded in full.

The Around-the-World Shoppers Club headquarters in the United States are located at 71 Concord Street, Dept. 209, Newark 5, New Jersey. You may join simply by sending your name and address, together with remittance for the term of membership desired, as explained above. Why not do it now, while an extra gift is being offered without extra charge to all new members.

· New Machines and Gadgets ·

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C.; and ask for Gadget Bulletin 694. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

❁ *ELECTRIC SOCKET is built into a reel that pays out as much as 25 feet of extension cord, keeping the surplus footage neatly coiled around its spindle. The rubber-coated cord winds on and off the reel without tangling, the manufacturer reports. Equipped with finger-grip handles, the reel is 6¼ inches in diameter and 5½ inches from flange to flange.*

Science News Letter, October 3, 1953

❁ *PLASTIC STAMPS, made of vinyl resins, can be used even with acid etching "inks" for permanent marking of metal and non-porous surfaces. The rugged stamps also print clear, clean impressions with ordinary stamp-pad ink and rarely require cleaning.*

Science News Letter, October 3, 1953

❁ *NEW EMERY board, made of a durable metal, has fine powder-like texture that does not rasp, yet leaves no dust under the fingernails. Rustless and easy to sterilize, the flexible "board" comes in two purse "sizes" and a "professional" eight-inch size.*

Science News Letter, October 3, 1953

❁ *CAR SAFETY-LOCK, designed to prevent children from accidentally opening the doors, replaces the inside push-down door-lock button on most cars. A pushbutton "snaps" the lock, shown in the photograph, but the ignition key is required to unlock it. The maker declares the device can be installed in one minute.*

Science News Letter, October 3, 1953

❁ *3-D FAIRY tales thrill small children with their startling illusion of depth. Seen through a new, adjustable plastic viewer, the fairy-tale set pictures 10 exciting yarns designed to keep children wide-eyed and open-mouthed. Seven pictures show how Christmas began.*

Science News Letter, October 3, 1953

❁ *ELECTRIC SOCKS, operating on six-volt batteries, are designed to keep toes warm in sub-zero weather. Insulated wires connect the socks with a battery carrier worn on the belt. Wires run beneath clothing along each leg without hindering movement. The manufacturer reports that the socks should be particularly welcomed by hunters, skiers, football fans and persons who must work outdoors during very cold weather.*

Science News Letter, October 3, 1953

❁ *CIRCULAR BIRD feeder holds almost two normal-sized boxes of birdseed in its transparent plastic reservoir. As the birds deplete the seed in the feeding tray, more seed trickles down from the reserve supply. The transparent bin also provides a one-glance check on the amount of seed left.*

Science News Letter, October 3, 1953

❁ *ADJUSTABLE PIPE jaws are spring-held to the faces of standard vises and tenaciously grip any pipe or round stock from one-eighth of an inch to two inches in diameter. Especially useful in home and commercial shops, the jaws weigh 14 ounces and are made of a patented process semi-steel.*

Science News Letter, October 3, 1953

Do You Know?

Old steam *radiators* that have become leaky around their bases often can be turned upside down and used satisfactorily for another 20 years.

Cobalt is one of the trace elements required for proper growth and nutrition of plant life.

Wisconsin's annual *milk* production of 15,000,000,000 pounds is the greatest for any single dairy source in the United States.

A *jack rabbit* can run as fast as a good race horse, often obtaining speeds up to 45 miles an hour.